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| APPLICATION NO. | FILED DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|------------|----------------------|---------------------|-------------------------------|
| 09/831,411 | 05/07/2001 | Andrew J. Sanderson | 1082-033 | 4272 |
| 7590 | 08/11/2004 | | | |
| Sullivan Law Group Suite 120 5060 North 40th Street Phoenix, AZ 85018 | | | | EXAMINER PEELY, MICHAEL J |
| | | | | ART UNIT 1712 PAPER NUMBER |

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-----------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/831,411 | SANDERSON ET AL. |
| | Examiner Michael J Feely | Art Unit 1712 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 May 2001.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-33 is/are rejected.
- 7) Claim(s) 5-11 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 07 May 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>0501</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 5-11 are objected to because of the following informalities: these claims are drawn to, "A thermoplastic elastomer as defined in claim 1;" however, claim 1 is drawn to a method of preparing a thermoplastic elastomer. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 6 recite the limitation "the difunctional oligomer" in the method of claim 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 7-11, 19-22, and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wardle (US Pat. No. 4,806,613).

Regarding claims 1-4 and 7-11, Wardle discloses (*I*) a method of preparing a thermoplastic elastomer (Abstract) comprising:

- (a) *providing A blocks and B blocks terminated with respective isocyanate-reactive groups at approximately stoichiometric ratios intended to be present in the thermoplastic elastomer (Abstract; column 3, line 64 through column 4, line 15), the A blocks being crystalline below about 75°C and derived from monomers comprising at least one member selected from the group consisting of oxetane derivatives and tetrahydrofuran derivatives (column 3, line 64 through column 4, line 9), the B blocks being amorphous above about -20°C and derived from monomers comprising at least one member selected from the group consisting of oxetane and derivatives thereof, tetrahydrofuran and derivatives thereof, and oxirane and derivatives thereof (column 3, line 64 through column 4, line 9);*
- (c) *end-capping the A blocks and the B blocks in a non-halogenated solvent by reacting the A blocks and the B blocks with at least one diisocyanate in which a first isocyanate moiety thereof is substantially more reactive with the terminal groups of the blocks as a second isocyanate moiety thereof, whereby the more reactive first isocyanate moiety is capable of reacting with the terminal groups of the blocks, leaving the less reactive second isocyanate moiety free and unreacted (column 7, lines 38-53; column 8, lines 60-68); and*
- (d) *linking the end-capped A blocks and the end-capped B blocks together in the non-halogenated solvent with at least one linking compound comprising two isocyanate-reactive groups (column 9, lines 1-26) which are sufficiently sterically unhindered to react with the free and unreacted isocyanate moieties of the end-capped blocks (column 7, lines 38-53);*

(3) wherein said end-capping (c) comprises separately end-capping the A blocks and the B blocks in their respective solutions (column 7, lines 38-53); (4) wherein said steps are conducted in the absence of any halogenated solvent (column 8, lines 60-68; column 9, lines 18-26); (7) wherein the thermoplastic elastomer has a weight average molecular weight of at least 40,000 and a number average molecular weight of at least 10,000 (Table III); (8) wherein the thermoplastic elastomer has a weight average molecular weight of at least 60,000 and a number average molecular weight of at least 12,000 (Table III); (9) wherein the thermoplastic elastomer has a weight average molecular weight of at least 80,000 and a number average molecular weight of at least 15,000 (Table III); (10) wherein a weight ratio of A to B blocks is between about 15:85 to about 40:60 (column 9, lines 30-33); and (11) wherein the isocyanate-reactive terminal groups of the A and B blocks are hydroxyl groups (column 7, lines 54-57).

Regarding claims 19-22 and 30-33, Wardle discloses (19) a method of making an energetic composition (Abstract) comprising:

- (a) *providing* A blocks and B blocks terminated with respective isocyanate-reactive groups at approximately stoichiometric ratios intended to be present in the thermoplastic elastomer (Abstract; column 3, line 64 through column 4, line 15), the A blocks being crystalline below about 75°C and derived from monomers comprising at least one member selected from the group consisting of oxetane derivatives and tetrahydrofuran derivatives (column 3, line 64 through column 4, line 9), the B blocks being amorphous above about -20°C and derived from monomers comprising at least one member selected from the group consisting of oxetane and derivatives thereof, tetrahydrofuran and derivatives thereof, and oxirane and derivatives thereof (column 3, line 64 through column 4, line 9);

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- (c) end-capping the A blocks and the B blocks in a non-halogenated solvent by reacting the A blocks and the B blocks with at least one diisocyanate in which a first isocyanate moiety thereof is substantially more reactive with the terminal groups of the blocks as a second isocyanate moiety thereof, whereby the more reactive first isocyanate moiety is capable of reacting with the terminal groups of the blocks, leaving the less reactive second isocyanate moiety free and unreacted (column 7, lines 38-53; column 8, lines 60-68); and
- (d) linking the end-capped A blocks and the end-capped B blocks together in the non-halogenated solvent with at least one linking compound comprising two isocyanate-reactive groups (column 9, lines 1-26) which are sufficiently sterically unhindered to react with the free and unreacted isocyanate moieties of the end-capped blocks (column 7, lines 38-53);
- (e) blending the thermoplastic elastomer with about 50 wt% to about 95 wt% of at least one solid selected from the group consisting of fuel particulates and oxidizer particulates (column 6, lines 54-65);
- (21) wherein said end-capping (c) comprises separately end-capping the A blocks and the B blocks in their respective solutions (column 7, lines 38-53); (22) wherein said steps are conducted in the absence of any halogenated solvent (column 8, lines 60-68; column 9, lines 18-26);
- (30) a method of making a rocket motor propellant comprising making an energetic composition as defined in claim 19 (column 1, lines 10-13);

(31) a method of making a gun propellant comprising making an energetic composition as defined in claim 19 (column 1, lines 10-13);

(32) a method of making an explosive comprising making an energetic composition as defined in claim 19 (column 1, lines 10-13); and

(33) a method of making a gasifier comprising making an energetic composition as defined in claim 19 (column 1, lines 10-13).

In all of the above claims, Wardle is silent regarding (1 & 19) (a) dissolving the polymer blocks into solution comprising at least one non-halogenated solvent, and (b) drying the dissolved A blocks and B blocks of water by azeotropic distillation of the non-halogenated solvent, (2 & 20) wherein said dissolving (a) comprises separately dissolving the A blocks and the B blocks into respective solutions. These steps represent a purification of the starting materials, which in turn produces a purified elastomeric final product. In light of this, it has been found that, "the mere purity of a product, by itself, does not render the product unobvious," – *Ex Parte Gray*, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989), *see MPEP 2144.04 VII*. It appears that these purification steps provide an obvious variation of the prior art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to purify the elastomeric final product of Wardle with the additional steps of dissolving and drying the polymer blocks prior to end-capping and linking because the elastomeric final product of Wardle has the same utility as the instant invention and the mere purity of a product does not render the product (and its process of making) unobvious.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 12-18, 23 and 24 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 and 11 of copending Application No. 09/436,440 in view of Wardle et al. (US Pat. No. 4,806,613).

This is a provisional obviousness-type double patenting rejection.

Regarding claims 12-18, 23, and 24, the instant claims are drawn to a binder comprising:

- a) about 50 wt% to about 95 wt% of at least one solid selected from the group consisting of fuel material particulates and oxidizer particulates; and
- b) at least one thermoplastic elastomer having A blocks and B blocks and being present in a substantially solid state to immobilized the particulates.

Claims 1-6 and 11 of copending 09/436,440 teach all the limitations of the thermoplastic elastomer set forth in instant claims 12-16, wherein the thermoplastic elastomer is, "*present in a solid state for use as a binder for at least one of a propellant, explosive, and gasifier.*"

However, the copending claims do not explicitly feature: **(12)** about 50 wt% to about 95 wt% of at least one solid selected from the group consisting of fuel material particulates and oxidizer particulates; **(17)** wherein the solid is at least one member selected from the group consisting of aluminum particles, ammonium perchlorate, and ammonium nitrate; **(18)** further comprising at

least one member selected from the group consisting of *see claim 18 for list*; (23) an explosive comprising the binder of claim 12; and (24) a gasifier comprising the binder of claim 12.

Wardle discloses an analogous thermoplastic elastomer used as binders in high-energy compositions, such as *propellants, explosives, gasifiers*, or the like (column 1, lines 10-13). Wardle also discloses, “The solids content of the high-energy composition generally ranges from about 50 wt percent to about 90 wt percent, higher solids loading generally being preferred so long as this is consistent with structural integrity. The solids include *fuel material particulates*, such as *particulate aluminum*, and/or *oxidizer particulates*, such as *ammonium perchlorate, cyclotetramethylene tetranitramine* and *cyclotrimethylene trinitramine*,” (column 6, lines 54-62). The only difference in Wardle is that the linking group is not oligomeric (column 9, lines 1-18). Regardless, the teachings of Wardle demonstrate these elastomers and solids are recognized in the art as suitable materials for high-energy compositions. In light of this, it has been found the selection of known materials based on their suitability for intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the thermoplastic elastomer (*present in a solid state for use as a binder for at least one of a propellant, explosive, and gasifier*) of the copending US application in combination with about 50 wt% to about 95 wt% of fuel material particulates and oxidizer particulates (*including those set forth in instant claims 17 and 18*) because Wardle teaches a composition featuring an analogous thermoplastic elastomer and 50 wt% to about 95% of solid fuels and/or oxidizers, resulting in the formation of a high-energy composition used as a propellant, explosive, or gasifier.

8. Claim 25-29 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of copending Application No. 09/436,440.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Regarding claims 25-29, the claims are drawn to a method of preparing a thermoplastic elastomer having A blocks which are crystalline at temperatures below 75°C and the B blocks which are amorphous at temperatures above about -20°C comprising the steps of:

- a) providing A blocks and B block at approximately the stoichiometric ratios that are intended to be present in the thermoplastic elastomer,
- b) end-capping the blocks by reacting the A blocks and B blocks with at least one diisocyanate, and
- c) linking the end-capped block with a difunctional oligomer.

Claims 1-6 of copending 09/436,440 teach all the limitations of the thermoplastic elastomer. These claims do explicitly disclose the generic steps of providing, end-capping, and linking; however, the product-by-process nature of the claim language inherently teaches and suggests these steps.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the instantly claimed method steps to form the thermoplastic elastomer of the copending application because the product-by-process nature of the copending claims inherently teaches and suggests the steps of providing, end-capping, and linking.

Allowable Subject Matter

9. Claims 5 and 6 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

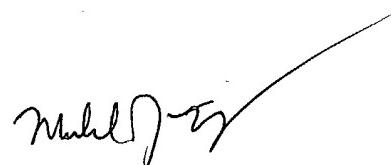
Claims 5 and 6: feature a difunctional oligomeric linking compound. Wardle is the closest prior art. Although they disclose no limit on the size of the linking compound, they fail to teach or suggest the use of an oligomeric compound (see column 9, lines 8-17).

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael J. Feely
Patent Examiner
Art Unit 1712

August 9, 2004